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ABSTRACT

Two groups of 15 Administrative Specialists, 71L Military Occupational Speciality (MOS), participated in four job-task refresher training sessions designed to enhance the typewriting of military correspondence. One group performed under a study training method which allowed use of a Correspondence Manual while arranging materials into the correct format, the second under a recall training method which required reliance on memory. Under both methods, participants received knowledge of results concerning both typewriting speed and accuracy. Straight-copy typewriting performance also was measured at each training session. Both training methods produced approximately a 36% increase in format arrangement speed without an associated increase in error. These benefits occurred regardless of a soldier's time in MOS or on-the-job typewriting experience. Straight-copy typewriting performance remained at an average level of twenty-three words per minute across sessions and did not reflect job-tasks typewriting proficiency. Timely and consistent use of knowledge of results was suggested to be the reason for the typewriting improvements obtained under both training methods. Similar use of knowledge of results in an on-the-job environment also should improve job-task typewriting performance, and thereby reduce the need for a formal refresher training program. (Author/YLB)

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Technical Report 410

EFFECTS OF REFRESHER TRAINING ON JOB-TASK TYPEWRITING PERFORMANCE

Joseph D. Hagman and Joel D. Schendel

Submitted by:
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Two groups of 15 Administrative Specialists, 71L Military Occupational Specialty (MOS), participated in four job-task refresher training sessions designed to enhance the typewriting of military correspondence. One group performed under a study training method which allowed use of a Correspondence Manual while arranging materials into the correct format. The other group performed under a recall training method which required reliance on memory rather than the Correspondence Manual for format information. Under both

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methods, soldiers received knowledge of results concerning both typewriting speed and accuracy. Straight-copy typewriting performance also was measured at each training session.

Both training methods produced approximately a 36% increase in format arrangement speed without an associated increase in error. These benefits occurred regardless of a soldier's time in MOS or on-the-job typewriting experience. Straight-copy typewriting performance remained at an average level of 23 net words per minute across sessions and did not reflect job-task typewriting proficiency.

Timely and consistent use of knowledge of results was suggested to be the reason for the typewriting improvements obtained under both training methods. Similar use of knowledge of results in an on-the-job environment also should improve job-task typewriting performance, and thereby reduce the need for a formal refresher training program.

FOREWORD

The Training Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI) has actively pursued a program of research in support of the systems engineering of training. A major focus of this research is to develop the fundamental data and technology necessary to field integrated systems for improving individual job performance. Such systems include Skill Qualification Testing (SQT), job performance aids, training courses in schools and in the field, performance criteria, and management and feedback systems. This report is one of a series on specific topics in the area of skill acquisition and retention of selected Chaparral skills and ARI Research Report 1211 investigated retention and relearning of typewriting skills. In response to requirements by the Deputy Chief of Staff for Training of the Army Training and Doctrine Command (TRADOC), the long-term goal is to develop methods for predicting proficiency loss for all types of skills and for determining effective training procedures for reducing this loss. The work was accomplished by ARI personnel under Army Project 2Q162722A777, FY 1979, "Individual Training Technology" with the combined support of COL R. S. Kubby, Deputy Assistant Commandant; LTC J. I. Spencer and Mr. H. L. Chipman, Directorate of Evaluation, at the US Army Engineer School, Fort Belvoir, Virginia.

Joseph Zeidner

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Technical Director

EFFECTS OF REFRESHER TRAINING ON JOB-TASK TYPEWRITING PERFORMANCE

BRIEF

Requirement:

To determine the effect of refresher training on the job-task typewriting performance of Army Administrative Specialists, 71L Military Occupational Specialty (MOS); to compare the relative effectiveness of two refresher training methods on job-task typewriting performance; and to examine the relationship between straight-copy and job-task typewriting performance.

Procedure:

Two groups of 15 Administrative Specialists participated in four job-task training sessions designed to enhance the typing of Military Correspondence. Each group used a different training method. One method emphasized study; the other method emphasized recall. The study training method allowed soldiers to consult the Correspondence Manual AR 340-15 while arranging test materials into the correct modified block style format. The recall training method required soldiers to retrieve format information from memory during the arrangement of test materials. Under both training methods, soldiers received knowledge of results concerning both speed and accuracy of their typing performance. Straight-copy typing was measured at each session before the start of job-task typing training. Prior to the start of each session, soldiers completed a questionnaire. The general purpose of these questionnaires was to provide information on each soldier's time in MOS and the amount and kind of on-the-job typing each performed.

Findings:

Refresher training improved the ability of Administrative Specialists to type Military Correspondence. Both the study and the recall training methods produced approximately a 36 percent increase in format arrangement speed without an associated increase in error. The benefits derived from job-task typing training occurred regardless of a soldier's time in MOS or amount and kind of typing performed on the job. Straight-copy typing performance remained at an average level of 23 net words per minute across sessions. Job-task typing performance could not be predicted from straight-copy typing performance.

Utilization of Findings:

Refresher training not only provides an opportunity to regain lost skill, but also provides an opportunity to establish new skill, even on

tasks performed routinely on the job. Consistent and timely use of knowledge of results contributes to the effectiveness of formal refresher training. Similar use of knowledge of results in an on-the-job environment also should improve job-task typing performance, and thereby, reduce the need for a formal refresher training program. Supervisors can adopt such an approach immediately without the need to develop special training materials. Knowledge of soldiers' straight-copy typing skill does not insure accurate prediction of their skill at typing job-related materials.

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EFFECTS OF REFRESHER TRAINING ON JOB-TASK TYPEWRITING PERFORMANCE

INTRODUCTION

Proficient performance in many clerical tasks depends on typewriting skill. This skill may be measured in terms of either straight-copy or job-task typewriting performance. Straight-copy typewriting involves copying printed materials without change in form or arrangement (West, 1969, p. 322), and it depends primarily on key-stroking ability. Job-task typewriting involves more than basic key-stroking. It requires the ability to make decisions about the form and arrangement of typed materials. These decisions usually involve centering, vertical and horizontal placement, spacing between elements, and setting of margins and line headings.

A primary goal of the Army is to improve the job-task typewriting performance of its clerical personnel. However, relatively little research has been performed on job-task typing (e.g., Showel, 1972) compared to straight-copy typing (e.g., Hagman, 1979; US Army Administration Center, 1977). One result is that information is lacking on current levels of job-task typing performance and techniques for promoting it. A second result is that straight-copy typing performance has been used as an indicator of job-task typing performance. The validity of this approach can be questioned for two reasons. First, job-task typing speed is usually slower than straight-copy typing speed (West, 1969). Second, as one moves from straight-copy to job-task typing, there is a shift in emphasis from key-stroking ability to organizing and planning abilities (Muhich, 1974). Thus, straight-copy typing performance can be an inaccurate index of job-task typing performance and reveals little about the organizational skills required for effective on-the-job typing performance.

OBJECTIVES

In order to achieve its goal of improved job-task typing performance, the Army needs information which is related specifically to job-task typing. In particular, the Army needs data on (1) current job-task typewriting proficiency levels of its clerical personnel and (2) effective training methods for raising job-task typing performance. In addition, more data are required on the utility of straight-copy typing performance as an index of job-task typing performance. One objective of this research was to provide these data.

A second objective of this research was to test the hypothesis that refresher training provides opportunities for new learning, even in tasks performed routinely on the job. In support of this hypothesis, West (1969, p. 415) states that poor work habits tend to result if either speed or accuracy of typing is not given sufficient emphasis. If this emphasis is lacking on the job, refresher training, designed to provide it, may motivate soldiers to perform better and induce new learning (e.g., Newell, 1977). If new learning does occur, it should be in the form of relatively permanent increments in typing skill.

APPROACH

The job-task selected for training was the typing of Army correspondence. Two training methods were evaluated. One emphasized study; the other emphasized recall. During study, material to be learned is presented to the trainee. Study may involve either watching another person perform a task or the reading of printed materials. Regardless of form, study always involves an attempt to take in or receive information. During recall, an attempt is made to retrieve studied material from memory.

Training typically involves both study and recall segments. For example, a soldier being trained to type a Military Letter might examine the correct format depicted in a training manual (study) and then attempt to type the letter without aid of the manual (recall). The number and sequential arrangement of study and recall segments can vary depending upon the training procedure adopted.

Traditionally, learning has been assumed to occur only during study. Although the positive effect of recall on learning has been mentioned in the early literature (e.g., Gates, 1917; Raffel, 1934), only recently, has evidence been accumulating that recall may not only enhance learning (e.g., Lachman & Laughery, 1968) but also improve retention (e.g., Hogan & Kintsch, 1970; Thompson, Wenger, & Bartling, 1978). Thus, current viewpoints implicate both study and recall segments of training as contributors to learning and retention processes.

The beneficial effects of recall have been attributed to: (1) enhanced organization of material in memory resulting from its retrieval (Rosner, 1970), and (2) development of an efficient learning strategy in which missed items receive more attention than those previously recalled correctly (Lachman & Laughery, 1968). With much of job-task typing performance requiring possession of both efficient learning strategies and organizational skills, increased emphasis on recall during training should enhance typists' ability to meet both requirements. If true, recall may prove to be more beneficial to performance than study during training. The present research was designed to examine this possibility.

Two groups participated in four training sessions. The Study group always had a manual available which provided the format information necessary for successful completion of the job task. The Recall group also had this manual available, but only during sessions 1 and 4. During Sessions 2 and 3, the Recall group typed without the manual and, therefore, had to retrieve format information from memory. Both groups were permitted to use the manual during Session 4 since this is standard on-the-job procedure.

To increase the general benefit derived from training, several techniques recommended by West (1969) were incorporated into both job-task training methods. These techniques included the delivery of consistent and timely knowledge of results regarding speed and accuracy of work, use of unarranged training materials, and exposure to a variety of job tasks. Straight-copy typing performance also was measured to assess its value as a predictor of job-task typing performance.

METHOD

Subjects

Seventeen male and thirteen female Administrative Specialists, 71L Military Occupational Specialty (MOS), from Fort Belvoir, Virginia, served as subjects. All soldiers were working in their MOS at Skill Level 1 but differed in their grades and job titles. Table 1 shows the distribution of soldiers by grade and job-title. The median time in MOS for this sample of soldiers was 18 months and the range was 69 months.

Table 1
Number of Soldiers from each Grade and Job-title Category

Grade	Number
E2	6
E3	5
E4	19
Job Title	
Administrative Clerk	9
Clerk/Typist	10
File Clerk	3
Keypunch Operator	1
Mail or Distribution Clerk	4
Personnel Clerk	2
SIDPERS Clerk	1

Design

The 2x4 mixed-treatment design shown in Figure 1 was used. The between subjects variable was Groups (Study, Recall) and the within-subject variable was Sessions (1-4). Fifteen soldiers were assigned randomly to each of the two groups with the constraint that sex and grade be equated roughly across groups.

Materials

Two parallel sets of training materials were developed for both job-task and straight-copy typing. These sets were bound separately into booklets labeled either Form A or Form B.

Job-Task Booklets. Job-task booklets (Appendix A) contained test materials for the Military Letter, Memorandum, Indorsement, and Disposition Form. For each category of correspondence, test materials consisted of a test copy and an information copy. Test copies were arranged in the same format as the correspondence lesson materials contained in the Self-Evaluation Test Segment of Resource Workbooks prepared by the US Army Institute of Administration and were representative of standard military correspondence. Thus, the test copy contained the material to be typed but did not display it in the proper modified block style format. Instead, individual elements of correspondence (e.g., date, reference symbol, etc.) were placed on the right half of the test copy, and the labels identifying each element were placed on the left half. The information copy displayed the test copy material in the correct format.

Straight-copy Booklets. Straight-copy booklets (Appendix B) contained a 5-minute warmup exercise and two 5-minute typing tests. The two tests contained in Form A were prepared by the US Army Adjutant General School. Administration School officials used these tests for end-of-course testing when this research was conducted. Scientists at the US Army Research Institute for the Behavioral and Social Sciences (ARI) developed the two tests in Form B for use in an earlier research project (Hagman, 1979).

Because of the relationship between test difficulty and typing speed (Robinson, 1967), tests in each Form were equated for difficulty. Difficulty level was defined in terms of stroke intensity (average number of typewriter strokes per dictionary word, including interword space) and syllabic intensity (average number of speech syllables per dictionary word). The average values of stroke and syllabic intensity for each test Form are listed in Table 2. These values represent the average difficulty level of written business communication (West, 1969).

GROUPS		SESSIONS			
		1	2	3	4
Study	Tests	Straight-copy Job-task (with AR)	Straight-copy Job-task (with AR)	Straight-copy Job-task (with AR)	Straight-copy Job-task (with AR)
Recall	Tests	Straight-copy Job-task (with AR)	Straight-copy Job-task (without AR)	Straight-copy Job-task (without AR)	Straight-copy Job-task (with AR)

Figure 1. Experimental design.

Table 2
Stroke Intensity and Syllabic Intensity for Straight-copy Typewriting Contained in Each Training Form

Form	Stroke Intensity	Syllabic Intensity
A	6.07	1.67
B	6.14	1.64

As shown in Table 3, two orders of Form presentation were used across sessions. Eight soldiers from the Study and Recall groups were tested using Order 1, while seven soldiers in each group were tested using Order 2.

Table 3
Order of Form Presentation Across Sessions

Order	Sessions			
	1	2	3	4
1	A	B	B	A
2	B	A	A	B

Apparatus

Typing was performed on IBM Selectric II typewriters. Standard stop watches were used to measure typing speed to the nearest second.

Questionnaires

Soldiers completed a questionnaire prior to the start of each session. The purpose of the Session 1 questionnaire was to provide information on the demographic characteristics of the soldiers tested and the amount

and kind of typing each performed on the job. Questionnaires distributed during Sessions 2, 3, and 4 were designed to provide information on the soldiers' intersession typing experiences. The questionnaires appear in Appendix C.

Procedure

Each soldier participated in four successive training sessions. Sessions lasted approximately one hour and were separated by an average of seven days. Two to six soldiers were trained at one time, and this training consisted of straight-copy testing, 5 minutes rest, and then job-task testing.

Straight-copy testing. Soldiers were instructed to type the warmup exercise and the tests word for word and line for line. They also were instructed not to correct their errors while typing. The experimenter used a countdown procedure to begin each test and the word "stop" to end each test.

Job-task testing. During job-task testing, soldiers received the relevant job-task test booklet and a copy of Army Regulation (AR) 340-15. Soldiers were instructed to arrange each test copy into the correct modified block style format as specified in the AR. They were also reminded not to correct their errors while typing.

Soldiers were tested on all aspects of job-task typing, including inserting the paper, setting the margins and tabulator, key-stroking, and the planning and placement of individual elements of correspondence. Upon completion of each test, soldiers raised their hands and the experimenter recorded their completion times to the nearest second. Soldiers then compared their typed version of the test copy with the information copy located on the next page of the test booklet. The information copy was included to provide soldiers with immediate and precise knowledge of results about the quality of their work. Upon completing this comparison, soldiers signaled the experimenter and began typing the next test. At the end of each session, soldiers were given knowledge of results regarding their individual and composite task typing times.

As shown in Figure 1, the Recall and Study groups experienced the same procedure during Sessions 1 and 4. The main difference between these groups was in the way each used the AR during Sessions 2 and 3. Soldiers in the Study group opened the AR and used it for reference while arranging the test copy into the proper format.[1] They always were free to consult the AR, and therefore did not have to commit format information to memory. The Recall group attempted to arrange test

[1]Soldiers reported this to be the standard on-the-job typing procedure.

copies without using the AR. As a result, format information had to be retrieved from memory while typing. After typing each test, soldiers in the Recall group were allowed to check the AR as well as the information copy in the test booklets. Typing time and AR checking time were recorded for each test typed by the Recall group. These two times were added and the resulting completion time scores compared to the completion time scores resulting from the concurrent typing and AR checking performed by the Study group.

RESULTS AND DISCUSSION

Job-task Typewriting Performance

Job-task typing performance was evaluated for speed and accuracy. Task completion time was used as the measure for speed, while both format and content errors were used to measure accuracy. Errors were scored using a procedure similar to that used by end-of-course testing personnel at the Administration school. Each element of correspondence, e.g., date, body, etc., was examined for format and content errors. Format errors consisted of: (1) incorrect horizontal or vertical placement of all or part of an element, (2) incorrect punctuation, (3) addition of extra-task format material, and (4) omission of format material. The specific guidelines on format arrangement contained in AR 340-15 were used to score format errors. Content errors consisted of incorrect key stroking and reflected straight-copy typewriting accuracy on job-task materials.

Separate analyses of variance were performed on speed and accuracy scores for both individual and combined test typing. These analyses revealed that: (1) training improved job-task typing time; (2) both training methods produced this improvement; and (3) the improvement was not offset by a concomitant increase in either format or content errors.

Speed. As shown in Figure 2, the average total amount of time taken to complete all four tasks decreased for both groups across the four training sessions. These decreases amounted to 37.8% for the Study group and 35.1% for the Recall group and were responsible for a significant[2] main effect of Sessions, F (3, 84) = 69.49. This main effect also was significant for the individual tests of Military Letter, F (3, 84) = 32.07, Memorandum, F (3, 84) = 8.61, and Disposition Form, F (3, 84) = 37.08. No other significant effects were found. Thus, training reduced job-task typing times, but the magnitude of these decreases was not a function of the specific training method used.

Accuracy. As shown in Figure 3, combined test format and content errors remained essentially constant across sessions for both groups. Additional analysis of individual test performance revealed that only

[2]The rejection region equalled .05 in all cases.

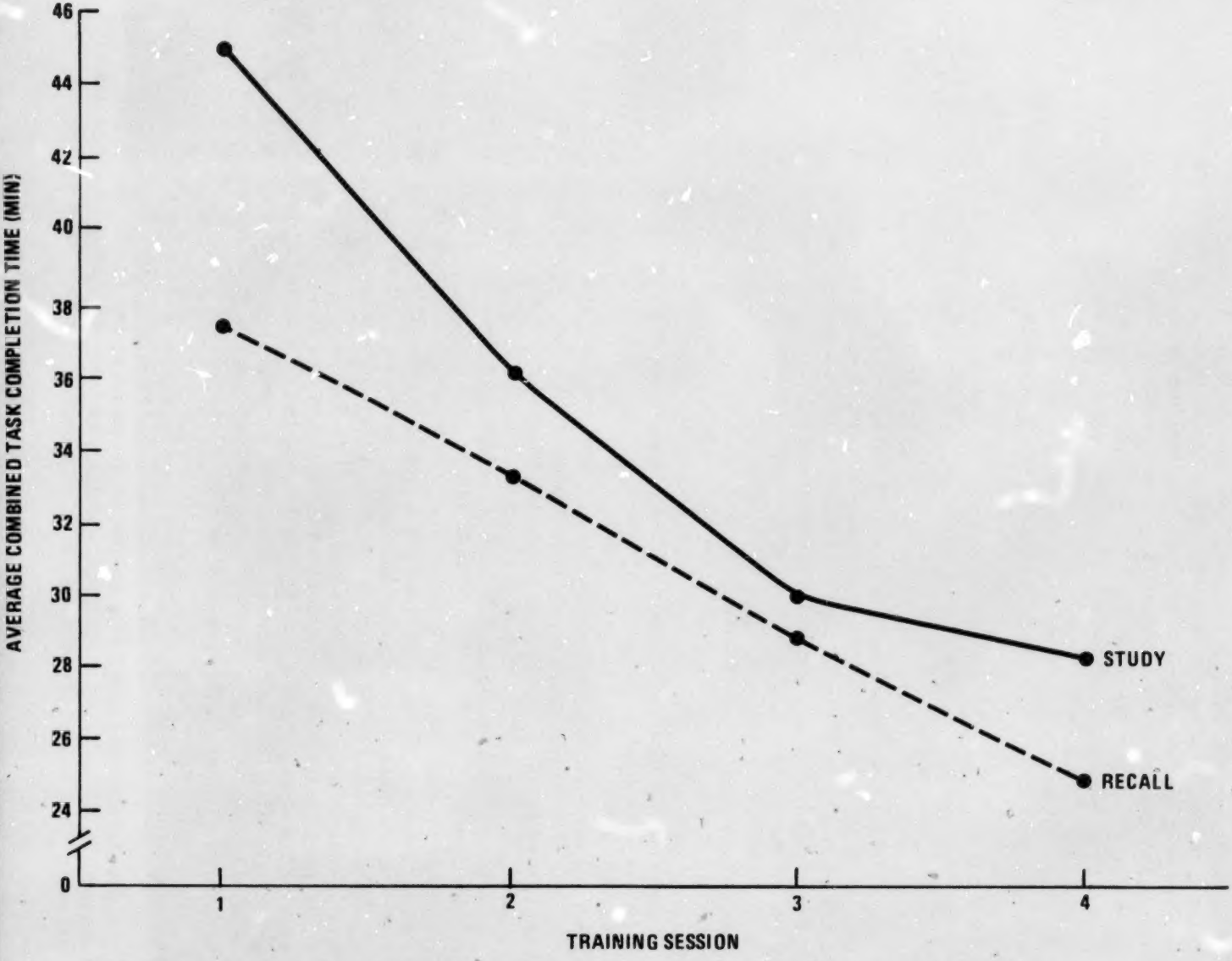

Figure 2. Average completion times for combined job-task testing at each session.

the main effects of Groups and Sessions were significant for format errors committed in Memorandum typing. The Groups effect revealed that the Recall group was inferior to the Study group, $F(1.28) = 3.91$ and the Sessions effect revealed that both groups increased their errors over sessions, F (3, 84) = 4.24. These two effects were not consistent with the accuracy comparisons performed on both the combined test error data of Figure 3 and on the error data from the other individual tests, i.e., Military letter, Indorsement and Disposition Form. Thus, in general, neither the study nor the recall method of training produced an observable decrease in the number of format or content errors committed over sessions. As West (1969, p. 415) has suggested, it is likely that format accuracy would have benefitted more had it been given added emphasis during training.

The lack of an observed performance change in number of errors may have been the result of an over emphasis on speed. Test instructions stressed both speed and accuracy. However, the competitive atmosphere associated with group testing and the knowledge of results regarding speed given after each session may have induced soldiers to force speed at the expense of accuracy. If no learning had occurred during training, this emphasis on speed would have caused a typical speed-accuracy trade off with an increase in format errors. This did not occur, therefore, it appears likely that format learning was sufficient to offset these expected errors but not sufficient to yield an observable increase in accuracy across sessions. Content errors, on the other hand, probably remained constant over sessions because insufficient training time was given to have an appreciable impact on straight-copy typing. As indicated earlier, content errors result from incorrect key-stroking and reflect straight-copy typewriting accuracy on job-task materials.

Use of the AR at Session 4 may have precluded the expected job-task typing benefits resulting from emphasizing recall during testing. With the AR present during testing, it was unnecessary for soldiers to retrieve format information from memory. As a result, they may have returned to their usual on-the-job typing method which involved dependence on the AR. Although a better test of the two training methods would have involved removing the AR for both groups at Session 4, this is not the way typing is done on the job. Therefore, the results would not have related to actual on-the-job typing procedures. Data obtained using the present design can be interpreted as supporting the conclusion that emphasizing recall in a job situation where soldiers rely on performance aids is not superior to emphasizing study.

Straight-copy Typewriting Performance

Straight-copy typing was scored in terms of speed (gross words per minute (GWPM)), accuracy (errors), and a combined weighting of speed and accuracy (net words per minute (NWPM)). Scoring methods used by the

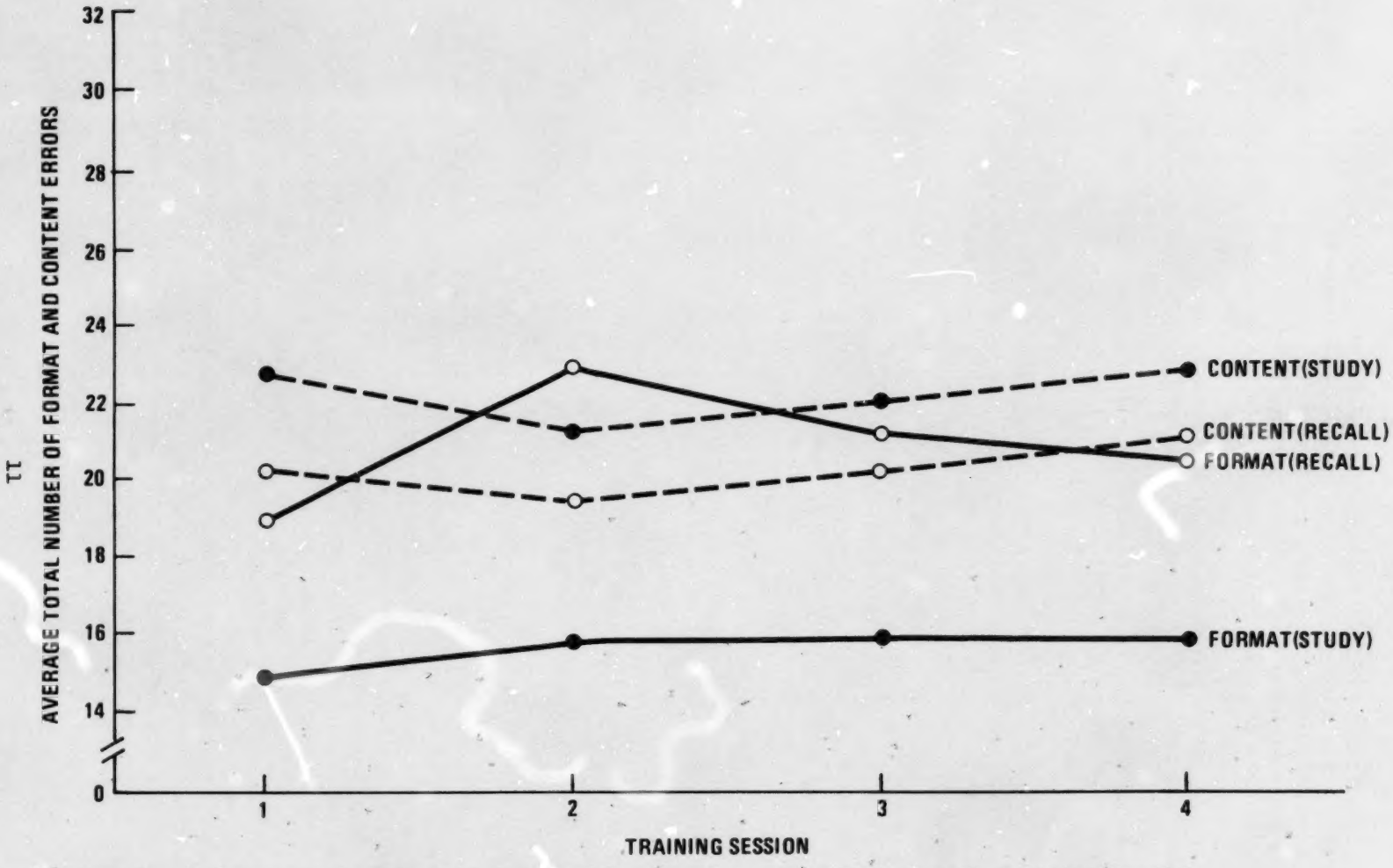

Figure 3. Average total number of format and content errors typed at each training session.

Administration School were adopted to score straight-copy typing performance. The formulas for GWPM and NWPM are shown in Appendix D; the rules used to evaluate errors are listed in Appendix E. Separate analyses of variance were performed on the average GWPM, NWPM, and error scores obtained from the two straight-copy tests taken at each session.

Speed. As shown in Figure 4, the average GWPM of each group increased across sessions. These increases produced a significant main effect of Sessions, F (3, 84) = 24.22. No other significant effects were found, indicating that typing speed did not differ across groups and that the magnitude of this benefit did not differ between groups across the four training sessions.

Accuracy. Figure 5 shows the average number of straight-copy errors committed by each group over sessions. The main effect of Sessions was significant, F (3, 84) = 7.17, revealing that errors generally increased across sessions. The magnitude of this increase varied between groups and contributed to a significant Groups x Sessions interaction, F (3, 84) = 3.19. Individual comparisons using the least squared difference (LSD) method (Carmer & Swanson, 1973), revealed that the Recall group's 63% increase in error between Session 1 and Session 4 was significant, LSD(84) = 7.03, but that the Study group's 21% increase in error was not.

Net Performance. Figure 6 shows the average NWPM typed by each group over sessions. Analysis of these data revealed no significant effects. Thus, the increase in speed observed across sessions was offset by a decrease in accuracy. As a result, no changes in net performance were found. Soldiers typed an average of 23 NWPM. This is above the minimum standard of 20 NWPM in effect when most of these soldiers graduated from AIT. However, it is below the current minimum AIT graduation standard of 25 NWPM.

Correlational Data

Questionnaire responses. It is possible that the obtained improvements in typing speed were the result of typing correspondence between sessions rather than during the sessions themselves. To examine this possibility, the relationship between soldier's reported amounts of intersession typing and their session to session increases in typing speed were examined using Spearman Rank-Order Correlational Analyses. As shown in Table 4, the correlation between these two variables was significant early in training. This indicates that soldiers who typed infrequently between Sessions 1 and 2 benefitted more from training than those who typed frequently. However, this relationship failed to appear at later sessions. This lack of a consistent relationship between these two variables supports the interpretation that training, and not on-the-job typing, was responsible for the observed increases in typing speed.

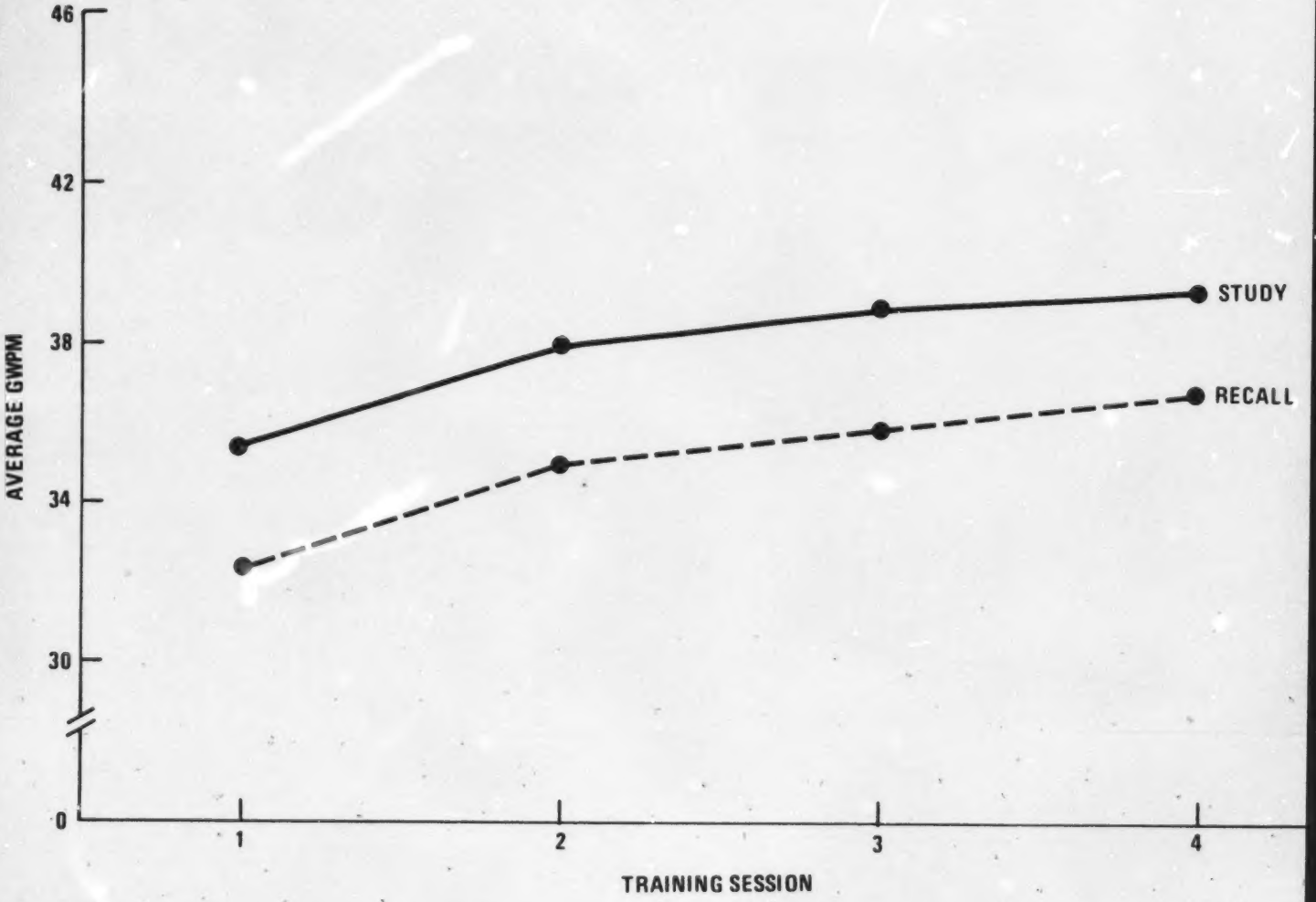

Figure 4. Average straight-copy gross words per minute (GWPM) typed at each training session.

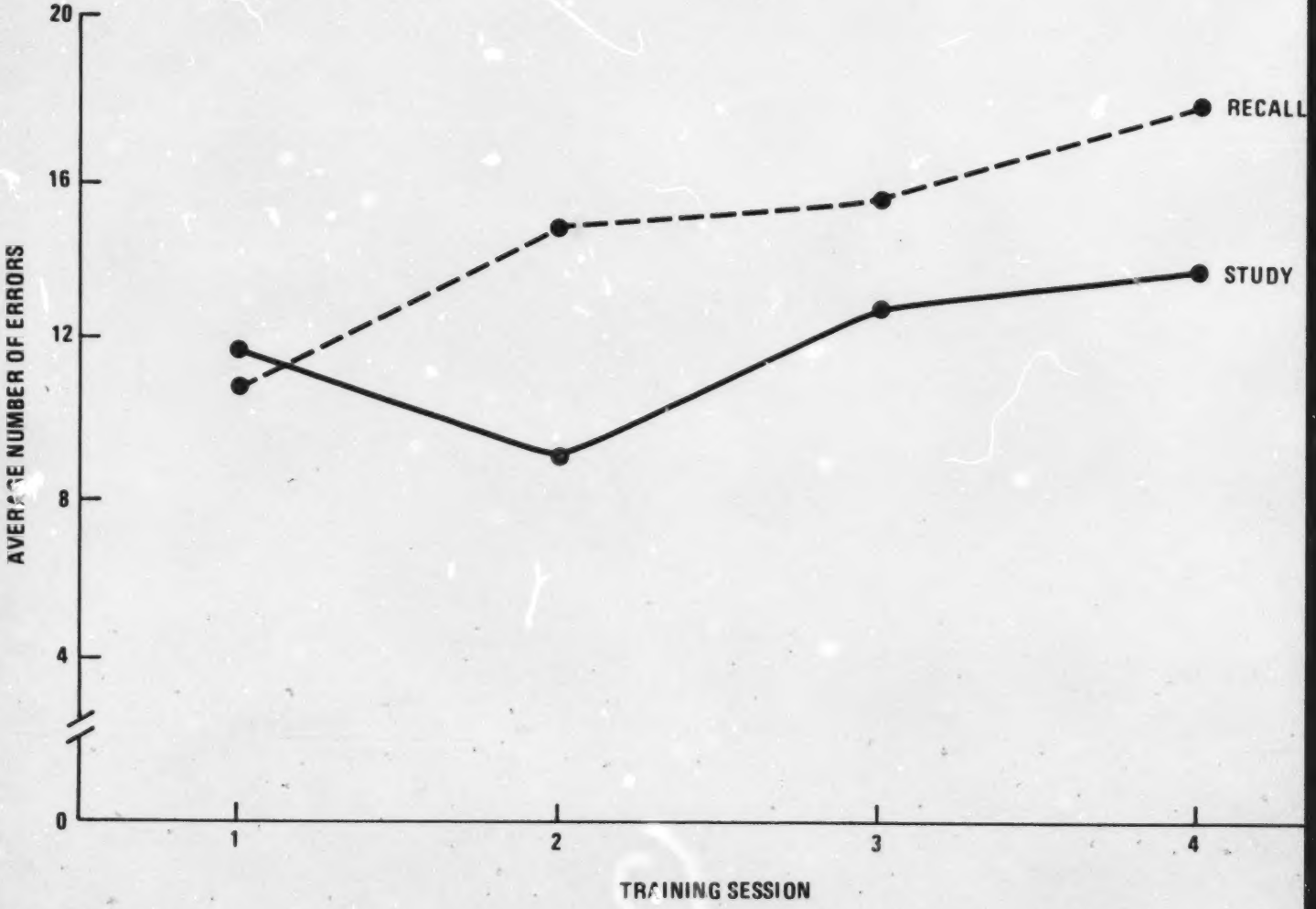

Figure 5. Average number of straight-copy errors typed at each training session.

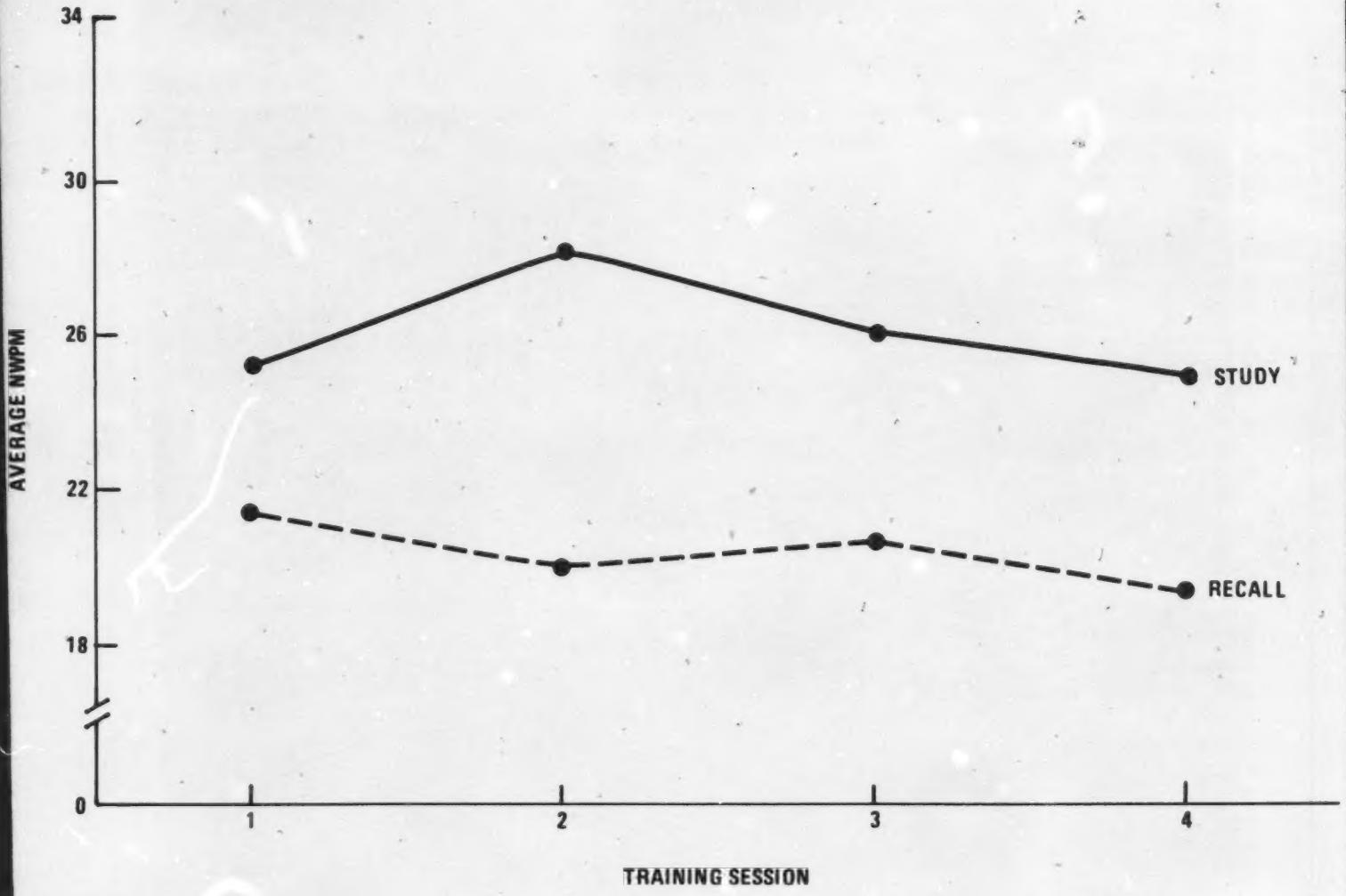

Figure 6. Average straight-copy net words per minute (NWPM) typed at each training session.

Table 4
Correlations Between Amount of On-the-job Typing and Increases in Job-Task Typing Speed Occurring Between Successive Sessions

Sessions	Correlation Coefficients
1 and 2	.43*
2 and 3	.25
3 and 4	.03

*p = .05

The improved job-task typing performance was the result of session to session increases in the ability of soldiers to arrange test materials. This improvement was not a function of increased key-stroking ability for net straight-copy typing performance did not improve over sessions.

Another correlational analysis revealed that increased job-task typing speed was not related to time in MOS, r = .06. This result is particularly compelling because 87% of the soldiers tested were typing at least some correspondence while on the job. Thus, the benefits of job-task typing training extended to experienced as well as inexperienced Administrative Specialists.

Speed-error Relationships. Table 5 reveals the intercorrelations for speed and accuracy of straight-copy and job-task typing at each training session. Although there was a consistent tendency for lower job-task typing times to be related to higher straight-copy typing speeds (Row 1); this relationship was nonsignificant at all sessions. However, one would expect the relationship between straight-copy and job-task typing speed to increase with the task length. As reported previously (Muhich, 1974), no relationship was found between speed and errors in straight-copy typing (Row 5). Job-task speed and errors were also not related with the exception of the speed-content error relationship at Session 4. Although nonsignificant, the relationship between job-task speed and format errors decreased over sessions while the relationship between job-task speed and content errors increased from Session 2 to Session 4. These trends could be interpreted as suggesting that as job-task training progresses, the contribution of format errors to job-task typing speed decreases while the contribution of content errors to job-task typing speed increases. The relationship between straight-copy errors and job-task content errors was significant

at 3 of the 4 training sessions (Row 2). This relationship was expected because job-task content errors were straight-copy errors committed in the context of job-task typing. Significant correlations were found between straight-copy and format errors at Sessions 2 and 3 (Row 3). Perhaps disallowing Recall group soldiers to use AR 340-15 during these sessions in some way was responsible for the obtained significance. Of more interest was the significant relationship between job-task format and content errors at all sessions (Row 4). It appears that within the context of job-task typing, soldiers who are accurate at typing content also are accurate at typing format.

CONCLUSIONS

Refresher training not only provides an opportunity to establish lost skill, but also provides an opportunity to establish new learning, even among tasks performed routinely on the job. In the present research, refresher training improved the ability of Administrative Specialists, 71L MOS, to type routine Military Correspondence. This improvement was demonstrated primarily in the form of increased format arrangement speed without an associated increase in error.

One possible reason for this improved job-task typing performance is that refresher training provided consistent and timely knowledge of results regarding typing speed and accuracy. Consistent and timely use of knowledge of results is perhaps the fundamental difference between formal training and on-the-job experience. Presumably, if immediate and consistent knowledge of results were given to soldiers while on the job, improved job-task typing would result. Supervisors could adopt this approach immediately using actual job-tasks rather than specially developed training materials. Knowledge of typing results could be provided by current supervisory personnel and an appropriate job-task manual, such as AR 340-15. The benefits of refresher training extended to experienced and inexperienced typists within Skill Level 1. Thus, formal job-task typing training or a similarly structured on-the-job environment could be of general benefit to Administrative Specialists.

Straight-copy typing speed was not related to job-task typing speed. As a result, knowledge of soldiers' straight-copy typing ability does not reveal necessarily their ability to type job tasks. This conclusion will apply more to the short job-task used in the present research which emphasizes format arrangement rather than key-stroking.

Table 5

Intercorrelations for Speed and Errors in Straight-Copy and Job-Task Typing for Individual Training Sessions

Rows	Variables	Sessions 1	2	3	4
1	Straight-Copy Speed and Job-Task Speed	-.13	-.17	-.13	-.27
2	Straight-Copy Errors and Job-Task Content Errors	.32	.41*	.45*	.43*
3	Straight-Copy Errors and Job-Task Format Errors	.25	.40*	.42*	.17
4	Job-Task Format and Job-Task Content Errors	.67*	.62*	.58*	.59*
5	Straight-Copy Speed and Errors	.02	-.02	-.05	.21
6	Job-Task Speed and Format Errors	.36	.19	.16	.14
7	Job-Task Speed and Content Errors	.35	.28	.31	.43*

* $p < .05$, two-tailed

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APPENDIX A

JOB-TASK BOOKLET

FORM A

Military Letter

LETTERHEAD:	DEPARTMENT OF THE ARMY Headquarters, 9th Infantry Division Fort Lewis, WA 98433
CURRENT DATE:	14 January 1976
SUSPENSE DATE:	S-19 January 1976
REFERENCE SYMBOL:	AFZH-FE
SUBJECT:	Wood Fuel for Heating
ADDRESS:	Commander, 1st Signal Group, 9th Infantry Division, Fort Lewis, WA 98433
AUTHORITY LINE:	FOR THE COMMANDER
SIGNED BY:	WILLIAM E. JOHNSON, COL, AGC, Adjutant General
INCLOSURE:	1 Incl as

BODY:

1. There is a supply of green oak and pine on hand in the wood yard near the Southern Pacific Railroad yard. There are also large quantities of dry blocks and scrap lumber. A map of the area is inclosed to help you locate the yard. 2. In order to conserve the supply of dry wood, your organization will accept 50 percent of the wood requirements in the form of green oak and pine and 50 percent in the form of dry wood, consisting of the blocks and scrap lumber. 3. Remove the wood from the present site without delay.

(4)

DEPARTMENT OF THE ARMY
Headquarters, 9th Infantry Division
Fort Lewis, WA 98433

(1)
S-19 January 1976
(1)
14 January 1976

(3)
AFZH-FE
(1)

SUBJECT: Wood Fuel for Heating

(3)

Commander
1st Signal Group, 9th Infantry Division
Fort Lewis, WA 98433

(4)

1. There is a supply of green oak and pine on hand in the wood yard near the Southern Pacific Railroad yard. There are also large quantities of dry blocks and scrap lumber. A map of the area is inclosed to help you locate the yard.

(1)

2. In order to conserve the supply of dry wood, your organization will accept 50 percent of the wood requirements in the form of green oak and pine and 50 percent in the form of dry wood, consisting of the blocks and scrap lumber.

(1)

3. Remove the wood from the present site without delay.

(1)

FOR THE COMMANDER:

(4)

1 Incl
as

WILLIAM E. JOHNSON
COL, AGC
Adjutant General

33

Memorandum

LETTERHEAD: DEPARTMENT OF THE ARMY
Office of the Chief of Information
Washington, D.C. 20310

OFFICE REFERENCE SYMBOL: DAIO-PI-B

TODAY'S DATE: 15 November 1976

ADDRESS: ARI, DCSPER

SUBJECT: ADY Committee Meeting

SIGNATURE BLOCK: MATTHEW R. CHAPMAN, LTC, AGC, ADY, Director

AUTHORITY LINE: FOR THE CHIEF OF INFORMATION

INCLOSURE: 1 Incl as

BODY:

1. The proposed meeting of the ADY Committee has been postponed from Monday to Tuesday. The meeting will be held in ADY Committee Meeting Room. 2. The agenda for the meeting is inclosed.

(4)

DEPARTMENT OF THE ARMY
Office of the Chief of Information
Washington, D.C. 20310

(3)

DAIO-PI-B 15 November 1976

(3)

MEMORANDUM FOR: ARI
DCSPER
(1)

SUBJECT: ADY Committee Meeting

(4)

1. The proposed meeting of the ADY Committee has been postponed from Monday to Tuesday. The meeting will be held in ADY Committee Meeting Room.
(1)

2. The agenda for the meeting is inclosed.
(1)

FOR THE CHIEF OF INFORMATION

(4)

1 Incl
as

MATTHEW R. CHAPMAN
LTC, AGC
ADY Director

Indorsement

SUSPENSE DATE:	S-19 Jan 77
CURRENT DATE:	8 Jan 77
DATE OF ORIGINAL LETTER:	1 Jan 77
REFERENCE SYMBOL:	ABPT
INDORSEMENT NUMBER:	3d Ind
SUBJECT:	Army Correspondence Course
PREPARING AGENCY:	Headquarters, US Army Field Artillery Center, Fort Sill, Oklahoma 73503
ADDRESS:	Commander, 100th Supply and Service Battalion, Fort Sill, Oklahoma 73503
SIGNED BY:	ALBERT G. CAMPBELL, MAJ, AGC, Asst AG
AUTHORITY LINE:	FOR THE COMMANDER
INCLOSURES:	1 Incl as

BODY:

1. The information requested by your battalion is inclosed. 2. The correspondence course will be of benefit to all.

S-19 Jan 77

ABPT (1 Jan 77) 3d Ind
SUBJECT: Army Correspondence Course

Headquarters, US Army Field Artillery Center, Fort Sill, Oklahoma 73503
8 Jan 77

TO: Commander, 100th Supply and Service Battalion, Fort Sill, Oklahoma 73503

1. The information requested by your battalion is inclosed.

2. The correspondence course will be of benefit to all.

FOR THE COMMANDER:

1 Incl
as

ALBERT G. CAMPBELL
MAJ, AGC
Asst AG

37

Disposition Form

REFERENCE SYMBOL:	FORSCOM
DATE:	15 July 77
SUSPENSE DATE:	S-30 July 77
WRITER:	CPT Cramer, phone 3241
TYPIST:	PFC Paul Wilson
THRU:	TRADOC
TO:	ARI
FROM:	AG
SUBJECT:	Military Personnel Officer Class
SIGNED BY:	A. W. DESOTO, LTC, AGC, Adjutant General
INCLOSURES:	1 Incl as

BODY:

1. Classes for Military Personnel officers will begin on 3 Aug 77. These classes will be conducted by the Personnel Management Branch. Enrollment is limited to 25 students. 2. At inclosure 1 is additional information about the course.

38

DISPOSITION FORM

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

S-30 July 77

REFERENCE OR OFFICE SYMBOL	SUBJECT
FORSCOM	Military Personnel Officer Class

XXX THRU TRADOC (1)

FROM AG

DATE 15 July 77 CMT 1

CPT Cramer/pw/3241 (2)

TO ARI (1)

1. Classes for Military Personnel officers will begin on 3 Aug 77. These classes will be conducted by the Personnel Management Branch. Enrollment is limited to 25 students. (1)

2. At inclosure 1 is additional information about the course.

(4)

1 Incl
as

A. W. DESOTO
LTC, AGC
Adjutant General

DA FORM 1 FEB 62 2496 REPLACES DD FORM 96, EXISTING SUPPLIES OF WHICH WILL BE ISSUED AND USED UNTIL 1 FEB 63 UNLESS SOONER EXHAUSTED.

GPO : 1968 O - 333-460

Nonmilitary Letter

LETTERHEAD: DEPARTMENT OF THE ARMY
Headquarters, 25th Artillery Brigade
Fort Sill, Oklahoma 73503

REFERENCE SYMBOL: AFFS-CAA

DATE: 12 April 1977

ADDRESS: Colonel James J. Reese, USA, 47th Ordnance Group, APO New York 09046

SALUTATION: Dear Colonel Reese:

COMPLIMNETARY CLOSE: Sincerely,

SIGNED BY: G. D. WALKER, COL, FC, Commanding

BODY:

Welcome to Fort Sill, Oklahoma. I was pleased to learn of your assignment to 25th Artillery Brigade.

COL Harry Owens, my Deputy Commanding Officer, will be your sponsor. He'll contact you in the near future.

I look forward to meeting you and your wife. Have a safe journey and, again, welcome to 25th Artillery Brigade.

DEPARTMENT OF THE ARMY
Headquarters, 25th Artillery Brigade
Fort Sill, Oklahoma 73503

AFFS-CAA 12 April 1976

Colonel James J. Reese, USA
47th Ordnance Group
APO New York 09046

Dear Colonel Reese:

Welcome to Fort Sill, Oklahoma. I was pleased to learn of your assignment to 25th Artillery Brigade.

COL Harry Owens, my Deputy Commanding Officer, will be your sponsor. He'll contact you in the near future.

I look forward to meeting you and your wife. Have a safe journey and, again, welcome to 25th Artillery Brigade.

Sincerely,

G. D. WALKER
COL, FC
Commanding

JOB-TASK BOOKLET

FORM B

Military Letter

LETTERHEAD:	DEPARTMENT OF THE ARMY Headquarters, 6th Infantry Division Fort Jones, Georgia 30312
CURRENT DATE:	10 October 1975
SUSPENSE DATE:	S-25 October 1975
REFERENCE SYMBOL:	HFEF-ZA
SUBJECT:	Line of Duty Investigation
ADDRESS:	Commander, 4th Infantry Division, Fort Oheefenohee, Georgia 30314
AUTHORITY LINE:	FOR THE COMMANDER
SIGNED BY:	REGINALD A. GARDNER, COL, AGC, Adjutant General
INCLOSURES:	1 Incl as

BODY:

1. The attached Form 188 pertaining to PFC John A. Jones, formerly of the 62nd Medical Group, is forwarded for inclusion with the line of duty investigation. This process should be considered normal and an example of standard procedure. 2. Current regulations require that line of duty investigations be submitted two days after the injury. In this case, the injury was a broken bone in the wrist. 3. Reasons for the delay in the submission of this line of duty investigation will be explained by the indorsement to this letter.

(4)

DEPARTMENT OF THE ARMY
Headquarters, 6th Infantry Division
Fort Jones, Georgia 30312

(1)
S-25 October 1975
(1)
10 October 1975

(3)
HFEF-ZA
(1)

SUBJECT: Line of Duty Investigation

(3)

Commander
4th Infantry Division
Fort Oheefenohee, Georgia 30314

(4)

1. The attached Form 188 pertaining to PFC John A. Jones, formerly of the 62nd Medical Group, is forwarded for inclusion with the line of duty investigation. This procedure should be considered normal and an example of standard procedure.

(1)

2. Current regulations require that line of duty investigations be submitted two days after the injury. In this case, the injury was a broken bone in the wrist.

(1)

3. Reasons for the delay in the submission of this line of duty investigation will be explained by the indorsement to this letter.

(1)

FOR THE COMMANDER

(4)

1 Incl
as

REGINALD A. GARDNER
COL, AGC
Adjutant General

43

Memorandum

LETTERHEAD: DEPARTMENT OF THE ARMY
Army Corps of Engineers
Fort Benning, Georgia 36104

REFERENCE SYMBOL: DAEN-AS-C

DATE: 8 April 1976

ADDRESS: CATB, ARTS

SUBJECT: TDY Lecture Session

SIGNATURE BLOCK: R. D. GRAVES
COL, Inf
Training Coordinator

AUTHORITY LINE: FOR THE CHIEF OF ENGINEERS

INCLOSURES: 1 Incl as

BODY:

1. As of this date, twenty-five people are planning to attend your lecture. Please have a sufficient quantity of adjunct materials available for those who attend. 2. A map of the post is inclosed.

(4)

DEPARTMENT OF THE ARMY
Army Corps of Engineers
Fort Benning, Georgia 36104

(3)

DAEN-AS-C 8 April 1976

(3)

MEMORANDUM FOR: CATB
ARTS
(1)

SUBJECT: TDY Lecture Session

(4)

1. As of this date, twenty-five people are planning to attend your lecture. Please have a sufficient quantity of adjunct materials available for those who attend.

(1)

2. A map of the post is inclosed.

(1)

FOR THE CHIEF OF ENGINEERS

(4)

1 Incl
as

R. D. GRAVES
COL, Inf
Training Coordinator

45

Indorsement

SUSPENSE DATE:	S-25 Aug 76
CURRENT DATE:	19 Jul 76
DATE OF ORIGINAL REQUEST:	12 Jul 76
REFERENCE SYMBOL:	ATZR
INDORSEMENT NUMBER:	2nd Ind
SUBJECT:	Computer Test Review
PREPARING AGENCY:	Headquarters, US Army Finance and Accounting Center, Fort Benjamin Harrison, IN 46216
ADDRESS:	Commander, DARCOM, 5001 Eisenhower Ave, Alexandria, VA 22333
SIGNED BY:	JOHN F. HARCOURT, LTC, FC, Asst Executive Officer
AUTHORITY LINE:	FOR THE COMMANDER
INCLOSURES:	1 Incl as

BODY:

1. The inclosed tests on the central processing unit have been completed.
2. Request the status of your review.

(5)

S-25 Jul 76

(7)

ATZR (12 Jul 76) 2nd Ind
SUBJECT: Computer Test Review

(1)

Headquarters, US Army Finance and Accounting Center, Fort Benjamin Harrison, IN 46216 19 Jul 76

(1)

TO: Commander, DARCOM, 5001 Eisenhower Ave, Alexandria, VA 22333

(1)

1. The inclosed tests on the central processing unit have been completed.

(1)

2. Request the status of your review.

(1)

FOR THE COMMANDER

(4)

1 Incl
as

JOHN F. HARCOURT
LTC, FC
Asst Executive Officer

47

Disposition Form

REFERENCE SYMBOL:	MILPERCEN
DATE:	17 June 76
SUSPENSE DATE:	S-27 June 76
WRITER:	2LT Bill George
TYPIST:	PFC John Doakes
THRU:	DCSLOG
TO:	ITSE
FROM:	GAO
SUBJECT:	Requisition for Manual Typewriters
SIGNED BY:	JOSEPH P. PARSONS, COL, Inf, Claims Officer
INCLOSURES:	1 Incl as

BODY:

1. Requisition Number 87, for manual typewriters is returned without action.
2. A copy of your requisition has been held for discussion with the budget officer in order to determine the availability of funds.

DISPOSITION FORM

S-27 June 76

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

REFERENCE OR OFFICE SYMBOL	SUBJECT
MILPERCEN	Requisition for Manual Typewriters

XEQ THRU DCSLOG (1) FROM GAO DATE 17 June 76 CMT 1

2LT George/jd/5176

TO ITSE (1) (2)

1. Requisition Number 87, for manual typewriters is returned without action. (1)

2. A copy of your requisition has been held for discussion with the budget officer in order to determine the availability of funds. (4)

1 Incl
as

JOSEPH P. PARSONS
COL, Inf
Claims Officer

49

DA FORM 1 FEB 62 2496 REPLACES DD FORM 96, EXISTING SUPPLIES OF WHICH WILL BE ISSUED AND USED UNTIL 1 FEB 63 UNLESS SOONER EXHAUSTED.

GPO : 1966 O - 203-650

Nonmilitary Letter

LETTERHEAD: DEPARTMENT OF THE ARMY
U.S. Army Administration Center
Fort Benjamin Harrison, IN 46216

REFERENCE SYMBOL: PERI-ID

DATE: 17 March 1974

ADDRESS: General John P. Jones, Letterman National Hospital, San Francisco, California 94129

SALUTATION: Dear General Jones:

COMPLIMENTARY CLOSE: Sincerely,

SIGNED BY: James B. David, MG, USA, Commanding

BODY:

Soon I will be taking leave and will be in your area. For once in my life, I really plan to take it easy on this vacation.

I am going to check on some real estate there and then do some fishing. If you can find your way clear, I sure could use some company on the lake.

As you know, Joyce is no fisherman at all.

(4)

DEPARTMENT OF THE ARMY
U.S. Army Administration Center
Fort Benjamin Harrison, IN 46216

(3)

PERI-ID 17 March 1974

(5)

General John P. Jones
Letterman National Hospital
San Francisco, California 94129

(4)

Dear General Jones:

(1)

Soon I will be taking leave and will be in your area. For once in my life, I really plan to take it easy on this vacation.

(1)

I am going to check on some real estate there and then do some fishing. If you can find your way clear, I sure could use some company on the lake.

(1)

As you know, Joyce is no fisherman at all.

(1)

Sincerely,

(4)

James B. David
MG, USA
Commanding

51

APPENDIX B

STRAIGHT-COPY TEST BOOKLETS

FORM A

Warm-up Exercise

The postal number that we type so neatly on labels and envelopes emerged from the Zoning Improvement Plan that the Post Office started in the spring of 1963 as a way to speed delivery of the mail. The five figures in the number are a special code that lets mail be sorted much more quickly and accurately. The plan caught on at once, and business firms throughout the nation put the codes on their mailing lists.

There are two phases, one concerned with bulk mail and another that has to do with individual cards and envelopes. Although typists are involved only in the second kind, they should know that ZIP numbers do not apply to letters alone.

The bulk mail, like magazines and circulars, has to be placed in bags, one for each local postal zone to which the mail is to go. The mailers like the plan for, once they adjust their mailing lists, it is easy to bag what they are mailing, and the bags start on their way without any delay.

Handling a single card or envelope is different. Such pieces must be sorted in the Post Office. If cards and envelopes have the full postal zone number in precisely the right place, the sorting can be done ten times as fast by a scanning machine as it ever could be by human eye and hand.

What is the proper place? It is after the state name, preceded by some blank space. How much space? The scanner requires not less than a sixth nor more than a half inch of space. The postal department stresses that the code be not less than two nor more than six spaces away from the state.

INSERT NEW PAPER AND BEGIN TYPING WITH THE WORDS, "The postal number...."

Typing Test CC

Military leadership is the art of influencing and directing men in such a way as to obtain their confidence, respect, and loyal cooperation in order to fulfill the mission. A leader is a person who influences and directs others.

An officer maintains close personal contact with only a few individuals. He must depend upon these individuals to make his will known and to carry out his purposes. The success of a unit depends upon the leader's capacity to promote desirable relationships between himself, the unit, and the individual members of the unit. Such conditions will result in highly motivated individuals, working as a team, with mutual confidence and respect.

A leader must know that his own character has an important influence on his subordinates. If he demonstrates high moral principles and integrity, these qualities will influence other people. A person who has matured in our society usually has acquired spiritual and moral values which not only strengthen the individual's character but also provide him with a source of inner strength and stability during times of crisis. Man's need to live up to the accepted spiritual and moral code of his society will help him to overcome fear. It will help provide courage to face difficult issues in his daily life or to fight well in combat.

INSERT NEW PAPER AND BEGIN TYPING THE NEXT PAGE.

The leader's religious life, which serves as a bulkwark in his own life when he is confronted with difficult challenges, is a vitally important factor in producing stable qualities in other men. If he thoroughly understands and exhibits moral and spiritual values, he will be prepared to lead his own men even in this nuclear era in which men will have to face the danger of tremendous destructive forces.

A good leader, by control of his voice and gestures, can have a firm and steadying influence over those around him, especially in combat. Few things can steady the morale of troops more than the realization that their leader, with full knowledge of the difficulties of a situation, neither looks nor acts worried as perhaps he has a right to do.

Knowledge of other men's behavior and of the reasons for this behavior is necessary for leadership. For example, certain conditions must be met if an individual's pattern of behavior is to be socially acceptable and satisfying to himself. These conditions, or roots of behavior, may be called basic human needs. The desire for group approval is one of the strongest urges of man. He will put forth great effort to win this approval.

INSERT NEW PAPER AND BEGIN TYPING WITH THE WORDS, "Military leadership...."

Typing Test DD

Before a selection of training activities can be made, a decision must be reached as to the immediate mission of a particular unit. Needs differ with the type of troops involved, their age, their physical condition, stage of training, and other local factors. The administration of a suitable program of training is not dependent upon elaborate facilities. Many of the activities require no special apparatus or facilities. However, the availability of equipment will have some effect upon the planning of the program.

The terrain and the type of climate of an area govern the selection of the courses for the training program. In regions where changes of climate are frequent, inclement weather schedules have to be planned. The availability of suitable local terrain for the various courses and games always has to be considered in working out a training program and schedule.

The training program, to be adequate, must insure the conditioning of all personnel. Improvement of muscle tone, strength, and muscular endurance is essential. The program should be well balanced and should provide opportunity for conditioning, variety, recreation, and the development of skills in addition to fostering desirable individual and team traits.

Conditioning drills, grass drills, and guerrilla tactics should be included in the program, but to a limited extent.

INSERT NEW PAPER AND BEGIN TYPING THE NEXT PAGE.

These activities provide a warmup for the sports and games and, in addition, reach muscle groups which may not be used in the athletic programs.

The athletic activities used should be of the most vigorous type. Such sports as soccer, basketball, and other similar games are recommended. Games such as softball and volleyball should not be used during the toughening and slow-improvement stages of the physical training program because they are not sufficiently strenuous. Football is an excellent game for well-conditioned men, but does not lend itself to use during the on-duty program because it requires a large amount of equipment.

The foot march may be used as part of physical conditioning. Obviously, foot care is essential to foot marching. The foot is deisgned to cushion the body against the shock of walking. The heel and ball of the foot and the ankle have little padding. The foot's blood vessels are close to the surface and are easily compressed by tight socks or shoes.

Prevention of foot trouble is the best first aid for feet. The Soldier can prevent many minor foot ailments by personal care. Blisters are caused by friction. Therefore, if the cause can be controlled, the blister may be prevented.

INSERT NEW PAPER AND BEGIN TYPING WITH THE WORDS, "Before a selection...."

STRAIGHT-COPY TEST BOOKLETS

FORM B

Warm-up Exercise

The postal number that we type so neatly on labels and envelopes emerged from the Zoning Improvement Plan that the Post Office started in the spring of 1963 as a way to speed delivery of the mail. The five figures in the number are a special code that lets mail be sorted much more quickly and accurately. The plan caught on at once, and business firms throughout the nation put the codes on their mailing lists.

There are two phases, one concerned with bulk mail and another that has to do with individual cards and envelopes. Although typists are involved only in the second kind, they should know that ZIP numbers do not apply to letters alone.

The bulk mail, like magazines and circulars, has to be placed in bags, one for each local postal zone to which the mail is to go. The mailers like the plan for, once they adjust their mailing lists, it is easy to bag what they are mailing, and the bags start on their way without any delay.

Handling a single card or envelope is different. Such pieces must be sorted in the Post Office. If cards and envelopes have the full postal zone number in precisely the right place, the sorting can be done ten times as fast by a scanning machine as it every could be by human eye and hand.

What is the proper place? It is after the state name, preceded by some blank space. How much space? The scanner requires not less than a sixth nor more than a half inch of space. The postal department stresses that the code be not less than two nor more than six spaces away from the state.

INSERT NEW PAPER AND BEGIN TYPING WITH THE WORDS, "The postal number....."

Typing Test AA

The research dealing with decline in mental abilities as a result of aging has often produced contradictory results. Thus, in some studies, definite and pronounced declines are found, whereas in other studies these declines, if any, are slight. When the results of many studies are combined, they show a gradual decline in ability. However, what this average decline represents is really a mixture of two populations--the elderly who are relatively stable in their abilities and those who decline abruptly and seriously in their abilities.

Although a lot of research has been done on intelligence, a number of methodological problems are come across by some who are concerned with the relationship of mental ability and age. What should be used as the criterion of mental ability? Typically, some form of intelligence test is used, and the performance of groups of old persons is compared with groups of younger persons. This procedure has several problems with it. Intelligence tests were not designed to be used with old persons; in most cases, they were designed and tested with young subjects. There are other measurement problems. Jones has discussed some of the other considerations involved in testing mental measurements of older persons.

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Often, tests used to measure overall mental ability will contain subtests that stress different abilities. Thus, in some cases, verbal ability may be critical, whereas on other subtests, speed of performance may be important. Often, the result of the test is given as one score, which combines the various subtests. We have already pointed out that a decline in speed of performance is found in older persons, and there is considerable evidence to indicate that there is a constant decline in performance in these types of subtests as a function of age. However, evidence for deline on verbal tests is much less clear; some studies show even a rise in performance with age.

BEGIN TYPING WITH THE WORDS, "The research dealing with....."

Typing Test BB

Experiments concerned with hearing loss induced by noise present the researcher with some problems. Records of industry can be examined to determine the approximate exposure to sound of persons who have since discovered that they have a hearing loss. This serves as a rough guide of the effect of some particular sound level on hearing loss. However, such factors as the frequency or frequencies of the sound, distance from the source, age of the worker, and a number of independent variables may have contributed to the observed hearing loss. The controlled laboratory experiment will reveal which variables are most suspect, but nothing can duplicate the exposure the worker might have received. The advantage of laboratory results is the certainty of the results; specific anteeedent sound levels can be related to observed hearing losses. With this certainty comes the problem of induced hearing loss itself. No experimenter would approach the situation with the intention of damaging someones hearing. Human subjects might be exposed to noise and the effects observed, but ethics require that the experiment be stopped if a decrement is observed. As a result, there is no certainty that higher noise levels would continue to damage hearing; perhaps the noise had already done the greatest amount of damage possible.

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Typing Test BB (continued

To ascertain the limits of noninjurious exposure to intense sounds, animals are often used. There is no direct generalization from the animal studies to humans, but there are not major changes between induced hearing loss in animals with specific noise conditions and those observed in men exposed, without intent to induce a hearing loss, to the same sound.

Regardless of the difficulties encountered in research in the area of noise-induced hearing loss, there is little question that it does take place. At one time the concern was primarily with industrial noise and noise in certain other occupations, but more recently, with the hard-rock groups, it appears that there may be a whole generation with noise-induced hearing loss.

BEGIN TYPING WITH THE WORDS, "Experiments concerned with....."

APPENDIX C

Session 1

Questionnaire

Project 2

1. Name _____ Phone Home _____ Work _____

2. Social Security Number _____

3. MOS _____

4. Time in MOS _____ Months

5. Location of AIT _____

6. Sex _____

7. Grade (circle one) E1 E2 E3 E4 E5 E6 E7 E8 E9

8. Skill Level (circle one) 1 2 3 4 5

9. Unit Address _____

10. How much of your work day has been devoted to typing since beginning your job? (circle one)
    1. None
    2. Some typing but less than two hours per day
    3. Between two and four hours per day
    4. Between four and six hours per day
    5. Between six and eight hours per day
    6. All day

    NOTE: If you have done no typing since beginning your job, do not answer questions 11 and 12, but instead, on the back of this sheet write a short description of your duties during this time.

11. What percentage of your typing time has been on correspondence since beginning your job? (circle one)
    1. 0-20%
    2. 20-40%
    3. 40-60%
    4. 60-80%
    5. 80-100%

12. What percentage of your time spent typing correspondence has been devoted to each of the following categories of correspondence since beginning your job?
    Disposition Form _____%
    Indorsement _____%
    Memorandum _____%
    Military Letter _____%
    Nonmilitary Letter _____%

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Sessions 2, 3, and 4

Project 2

Questionnaire

1. Name _____

2. How much of your work day has been devoted to typing since your last testing session approximately 2 weeks ago?
   1. None
   2. Some typing but less than two hours per day
   3. Between two and four hours per day
   4. Between four and six hours per day
   5. Between six and eight hours per day
   6. All day

   NOTE: If you have not done any typing since the last testing session, do not answer questions 3 and 4, but instead, on the back of this sheet write a short description of your duties during this time.

3. What percentage of your typing time has been spent on correspondence since your last testing session? (circle one)
   1. 0-20%
   2. 20-40%
   3. 40-60%
   4. 60-80%
   5. 80-100%

4. What percentage of your time spent typing correspondence has been devoted to each of the following categories of correspondence?
   Disposition Form _____%
   Indorsement _____%
   Memorandum _____%
   Military Letter _____%
   Nonmilitary Letter _____%

APPENDIX D

FORMULAS FOR GWPM AND NWPM

Scoring Formulas

$$GWPM = \frac{\text{Total Number of Typing Strokes}/5}{\text{Number of Minutes in Test}}$$

NWPM = GWPM - ERRORS

APPENDIX E

RULES FOR SCORING ERRORS

Rules for Determining Errors

A. Only one error will be charged to each word regardless of how many actual errors are made in the word. The following list describes the kinds of errors which will be counted:

1. A misspelling will be an error.

2. An omission will be an error. The omission of an entire line or more, or part of a sentence (two or more words), will also be an error.

3. A substitution or insertion will be an error.

4. A punctuation mark omitted or incorrectly copied will be an error unless it follows a word in which an error has been made.

5. If only part of a capital letter is typed, count one error; however, if the whole letter is visible as a unit, even though not properly in the line, no error is counted.

6. Any variation from the capitalization in the text of the test will be an error.

7. A strikeover will be an error.

8. An erasure will be an error.

9. An X-ed out word or word fragment will be an error.

10. A transposition will be an error.

11. If a fragment (any length) is typed twice, count the entire repeated fragment as only one error. In addition, count any errors made within the repeated fragment as one error. Words in the repeated fragment will not be counted in the word count.

12. Each failure to return the carriage to the left margin for the start of the next line will be an error unless due to equipment malfunction.

13. Each failure to double space between lines will be counted as an error. Single spacing and triple spacing between lines will be counted as errors. Only one error per line will be charged for this type of error.

14. Each paragraph which is not indented five spaces will be counted as an error unless due to equipment malfunction.

B. Types of questionable performance not counted as errors.

1. A faint impression, due to striking a key too lightly, is not an error if the entire letter is visible.

2. Failure to type word for word and line for line will not result in any error.

3. Any error which occurs in a last incomplete word will be ignored.

4. Incorrect spacing will not be counted as an error because of typewriter malfunctions.

ARI Distribution List

4 OASD (M&RA)
2 HQDA (DAMI-CSZ)
1 HQDA (DAPE PBR)
1 HQDA (DAMA-AR)
1 HQDA (DAPE-HRE-PO)
1 HQDA (SGRD-ID)
1 HQDA (DAMI-DOT-C)
1 HQDA (DAPC-PMZ-A)
1 HQDA (DACH-PPZ-A)
1 HQDA (DAPE-HRE)
1 HQDA (DAPE-MPO-C)
1 HQDA (DAPE-DW)
1 HQDA (DAPE-HRL)
1 HQDA (DAPE-CPS)
1 HQDA (DAFD-MFA)
1 HQDA (DARD-ARS-P)
1 HQDA (DAPC-PAS-A)
1 HQDA (DUSA-OR)
1 HQDA (DAMO-RQR)
1 HQDA (DASG)
1 HQDA (DA10-PI)
1 Chief, Consult Div (DA-OTSG), Adelphi, MD
1 Mil Asst. Hum Res, ODDR&E, OAD (E&LS)
1 HQ USARAL, APO Seattle, ATTN: ARAGP-R
1 HQ First Army, ATTN: AFKA-OI TI
2 HQ Fifth Army, Ft Sam Houston
1 Dir, Army Stf Studies Ofc, ATTN: OAVCSA (DSP)
1 Ofc Chief of Stf, Studies Ofc
1 DCSPER, ATTN: CPS/OCP
1 The Army Lib, Pentagon, ATTN: RSB Chief
1 The Army Lib, Pentagon, ATTN: ANRAL
1 Ofc, Asst Sect of the Army (R&D)
1 Tech Support Ofc, OJCS
1 USASA, Arlington, ATTN: IARD-T
1 USA Rsch Ofc, Durham, ATTN: Life Sciences Dir
2 USARIEM, Natick, ATTN: SGRD-UE-CA
1 USATTC, Ft Clayton, ATTN: STFTC-MO-A
1 USAIMA, Ft Bragg, ATTN: ATSU-CTD-OM
1 USAIMA, Ft Bragg, ATTN: Marquat Lib
1 US WAC Ctr & Sch, Ft McClellan, ATTN: Lib
1 US WAC Ctr & Sch, Ft McClellan, ATTN: Tng Dir
1 USA Quartermaster Sch, Ft Lee, ATTN: ATSM-TE
1 Intelligence Material Dev Ofc, EWL, Ft Holabird
1 USA SE Signal Sch, Ft Gordon, ATTN: ATSO-EA
1 USA Chaplain Ctr & Sch, Ft Hamilton, ATTN: ATSC-TE-RD
1 USATSCH, Ft Eustis, ATTN: Educ Advisor
1 USA War College, Carlisle Barracks, ATTN: Lib
2 WRAIR, Neuropsychiatry Div
1 DLI, SDA, Monterey
1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-MR
1 USA Concept Anal Agcy, Bethesda, ATTN: MOCA-JF
1 USA Arctic Test Ctr, APO Seattle, ATTN: STEAC-PL-MI
1 USA Arctic Test Ctr, APO Seattle, ATTN: AMSTE-PL-TS
1 USA Armament Cmd, Redstone Arsenal, ATTN: ATSK-TEM
1 USA Armament Cmd, Rock Island, ATTN: AMSAR-TDC
1 FAA-NAFEC, Atlantic City, ATTN: Library
1 FAA-NAFEC, Atlantic City, ATTN: Human Engr Br
1 FAA Aeronautical Ctr, Oklahoma City, ATTN: AAC-44D
2 USA Fld Arty Sch, Ft Sill, ATTN: Library
1 USA Armor Sch, Ft Knox, ATTN: Library
1 USA Armor Sch, Ft Knox, ATTN: ATSB-DI-E
1 USA Armor Sch, Ft Knox, ATTN: ATSB-DT-TP
1 USA Armor Sch, Ft Knox, ATTN: ATSB-CD-AD
2 HQUSACDEC, Ft Ord, ATTN: Library
1 HQUSACDEC, Ft Ord, ATTN: ATEC-EX-E -Hum Factors
2 USAEEC, Ft Benjamin Harrison, ATTN: Library
1 USAPACDC, Ft Benjamin Harrison, ATTN: ATCP-HR
1 USA Comm-Elect Sch, Ft Monmouth, ATTN: ATSN-EA
1 USAEC, Ft Monmouth, ATTN: AMSEL-CT-HDP
1 USAEC, Ft Monmouth, ATTN: AMSEL-PA-P
1 USAEC, Ft Monmouth, ATTN: AMSEL-SI-CB
1 USAEC, Ft Monmouth, ATTN: C, Facl Dev Br
1 USA Materials Sys Anal Agcy, Aberdeen, ATTN: AMXSY-P
1 Edgewood Arsenal, Aberdeen, ATTN: SAREA-BL-H
1 USA Ord Ctr & Sch, Aberdeen, ATTN: ATSL-TEM-C
2 USA Hum Engr Lab, Aberdeen, ATTN: Library/Dir
1 USA Combat Arms Tng Bd, Ft Benning, ATTN: Ad Supervisor
1 USA Infantry Hum Rsch Unit, Ft Benning, ATTN: Chief
1 USA Infantry Bd, Ft Benning, ATTN: STEBC-TE-T
1 USASMA, Ft Bliss, ATTN: ATSS-LRC
1 USA Air Def Sch, Ft Bliss, ATTN: ATSA-CTD-ME
1 USA Air Def Sch, Ft Bliss, ATTN: Tech Lib
1 USA Air Def Bd, Ft Bliss, ATTN: FILES
1 USA Air Def Bd, Ft Bliss, ATTN: STEBD-PO
1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Lib
1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: ATSW-SE-L
1 USA Cmd & General Stf College, Ft Leavenworth, ATTN: Ed Advisor
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: DepCdr
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: CCS
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCASA
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACO-E
1 USA Combined Arms Cmbt Dev Act, Ft Leavenworth, ATTN: ATCACC-CI
1 USAECOM, Night Vision Lab, Ft Belvoir, ATTN: AMSEL-NV-SD
3 USA Computer Sys Cmd, Ft Belvoir, ATTN: Tech Library
1 USAMERDC, Ft Belvoir, ATTN: STSFB-DQ
1 USA Eng Sch, Ft Belvoir, ATTN: Library
1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-TD-S
1 USA Topographic Lab, Ft Belvoir, ATTN: STINFO Center
1 USA Topographic Lab, Ft Belvoir, ATTN: ETL-GSL
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: CTD-MS
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATS-CTD-MS
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TE
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEX-GS
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTS-OR
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-DT
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-CTD-CS
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: DAS/SRD
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: ATSI-TEM
1 USA Intelligence Ctr & Sch, Ft Huachuca, ATTN: Library
1 CDR, HQ Ft Huachuca, ATTN: Tech Ref Div
2 CDR, USA Electronic Prvg Grd, ATTN: STEEP-MT-S
1 HQ, TCATA, ATTN: Tech Library
1 HQ, TCATA, ATTN: AT CAT-OP-Q, Ft Hood
1 USA Recruiting Cmd, Ft Sheridan, ATTN: USARCPM-P
1 Senior Army Adv., USAFAGOD/TAC, Elgin AF Aux Fld No. 9
1 HQ, USARPAC, DCSPER, APO SF 96558, ATTN: GPPE-SE
1 Stimson Lib, Academy of Health Sciences, Ft Sam Houston
1 Marine Corps Inst., ATTN: Dean-MCI
1 HQ, USMC, Commandant, ATTN: Code MTMT
1 HQ, USMC, Commandant, ATTN: Code MPI-20-28
2 USCG Academy, New London, ATTN: Admission
2 USCG Academy, New London, ATTN: Library
1 USCG Training Ctr, NY, ATTN: CO
1 USCG Training Ctr, NY, ATTN: Educ Svc Ofc
1 USCG, Psychol Res Br, DC, ATTN: GP 1/62
1 HQ Mid-Range Br, MC Det, Quantico, ATTN: P&S Div

1 US Marine Corps Liaison Ofc, AMC, Alexandria, ATTN: AMCGS-F
1 USATRADOC, Ft Monroe, ATTN: ATRO-ED
6 USATRADOC, Ft Monroe, ATTN: ATPR-AD
1 USATRADOC, Ft Monroe, ATTN: ATTS-EA
1 USA Forces Cmd, Ft McPherson, ATTN: Library
2 USA Aviation Test Bd, Ft Rucker, ATTN: STEBG-PO
1 USA Agcy for Aviation Safety, Ft Rucker, ATTN: Library
1 USA Agcy for Aviation Safety, Ft Rucker, ATTN: Educ Advisor
1 USA Aviation Sch, Ft Rucker, ATTN: PO Drawer O
1 HQUSA Aviation Sys Cmd, St Louis, ATTN: AMSAV-ZDR
2 USA Aviation Sys Test Act., Edwards AFB, ATTN: SAVTE-T
1 USA Air Def Sch, Ft Bliss, ATTN: ATSA TEM
1 USA Air Mobility Rsch & Dev Lab, Moffett Fld, ATTN: SAVDL-AS
1 USA Aviation Sch, Res Tng Mgt, Ft Rucker, ATTN: ATST-T-RTM
1 USA Aviation Sch, CO, Ft Rucker, ATTN: ATST-D-A
1 HQ, DARCOM, Alexandria, ATTN: AMXCD-TL
1 HQ, DARCOM, Alexandria, ATTN: CDR
1 US Military Academy, West Point, ATTN: Serials Unit
1 US Military Academy, West Point, ATTN: Ofc of Milt Ldrshp
1 US Military Academy, West Point, ATTN: MAOR
1 USA Standardization Gp, UK, FPO NY, ATTN: MASE-GC
1 Ofc of Naval Rsch, Arlington, ATTN: Code 452
3 Ofc of Naval Rsch, Arlington, ATTN: Code 458
1 Ofc of Naval Rsch, Arlington, ATTN: Code 450
1 Ofc of Naval Rsch, Arlington, ATTN: Code 441
1 Naval Aerospc Med Res Lab, Pensacola, ATTN: Acous Sch Div
1 Naval Aerospc Med Res Lab, Pensacola, ATTN: Code L51
1 Naval Aerospc Med Res Lab, Pensacola, ATTN: Code L5
1 Chief of NavPers, ATTN: Pers-OR
1 NAVAIRSTA, Norfolk, ATTN: Safety Ctr
1 Nav Oceanographic, DC, ATTN: Code 6251, Charts & Tech
1 Center of Naval Anal, ATTN: Doc Ctr
1 NavAirSysCom, ATTN: AIR-5313C
1 Nav BuMed, ATTN: 713
1 NavHelicopterSubSqua 2, FPO SF 96601
1 AFHRL (FT) Williams AFB
1 AFHRL (TT) Lowry AFB
1 AFHRL (AS) WPAFB, OH
2 AFHRL (DOJZ) Brooks AFB
1 AFHRL (DOJN) Lackland AFB
1 HQUSAF (INYSD)
1 HQUSAF (DPXXA)
1 AFVTG (RD) Randolph AFB
3 AMRL (HE) WPAFB, OH
2 AF Inst of Tech, WPAFB, OH, ATTN: ENE/SL
1 ATC (XPTD) Randolph AFB
1 USAF AeroMed Lib, Brooks AFB (SUL-4), ATTN: DOC SEC
1 AFOSR (NL), Arlington
1 AF Log Cmd, McClellan AFB, ATTN: ALC/DPCRB
1 Air Force Academy, CO, ATTN: Dept of Bel Scn
5 NavPers & Dev Ctr, San Diego
2 Navy Med Neuropsychiatric Rsch Unit, San Diego
1 Nav Electronic Lab, San Diego, ATTN: Res Lab
1 Nav TrngCen, San Diego, ATTN: Code 9000-Lib
1 NavPostGraSch, Monterey, ATTN: Code 55As
1 NavPostGraSch, Monterey, ATTN: Code 2124
1 NavTrngEquipCtr, Orlando, ATTN: Tech Lib
1 US Dept of Labor, DC, ATTN: Manpower Admin
1 US Dept of Justice, DC, ATTN: Drug Enforce Admin
1 Nat Bur of Standards, DC, ATTN: Computer Info Section
1 Nat Clearing House for MH-Info, Rockville
1 Denver Federal Ctr, Lakewood, ATTN: BLM
12 Defense Documentation Center
4 Dir Psych, Army Hq, Russell Ofcs, Canberra
1 Scientific Advsr, Mil Bd, Army Hq, Russell Ofcs, Canberra
1 Mil and Air Attache, Austrian Embassy
1 Centre de Recherche Des Facteurs, Humaine de la Defense Nationale, Brussels
2 Canadian Joint Staff Washington
1 C/Air Staff, Royal Canadian AF, ATTN: Pers Std Anal Br
3 Chief, Canadian Def Rsch Staff, ATTN: C/CRDS(W)
4 British Def Staff, British Embassy, Washington
1 Def & Civil Inst of Enviro Medicine, Canada
1 AIR CRESS, Kensington, ATTN: Info Sys Br
1 Militaerpsykologisk Tjeneste, Copenhagen
1 Military Attache, French Embassy, ATTN: Doc Sec
1 Medecin Chef, C.E.R.P.A.-Arsenal, Toulon/Naval France
1 Prin Scientific Off, Appl Hum Engr Rsch Div, Ministry of Defense, New Delhi
1 Pers Rsch Ofc Library, AKA, Israel Defense Forces
1 Ministeris van Defensie, DOOP/KL Afd Sociaal Psychologische Zaken, The Hague, Netherlands